FIG. 1

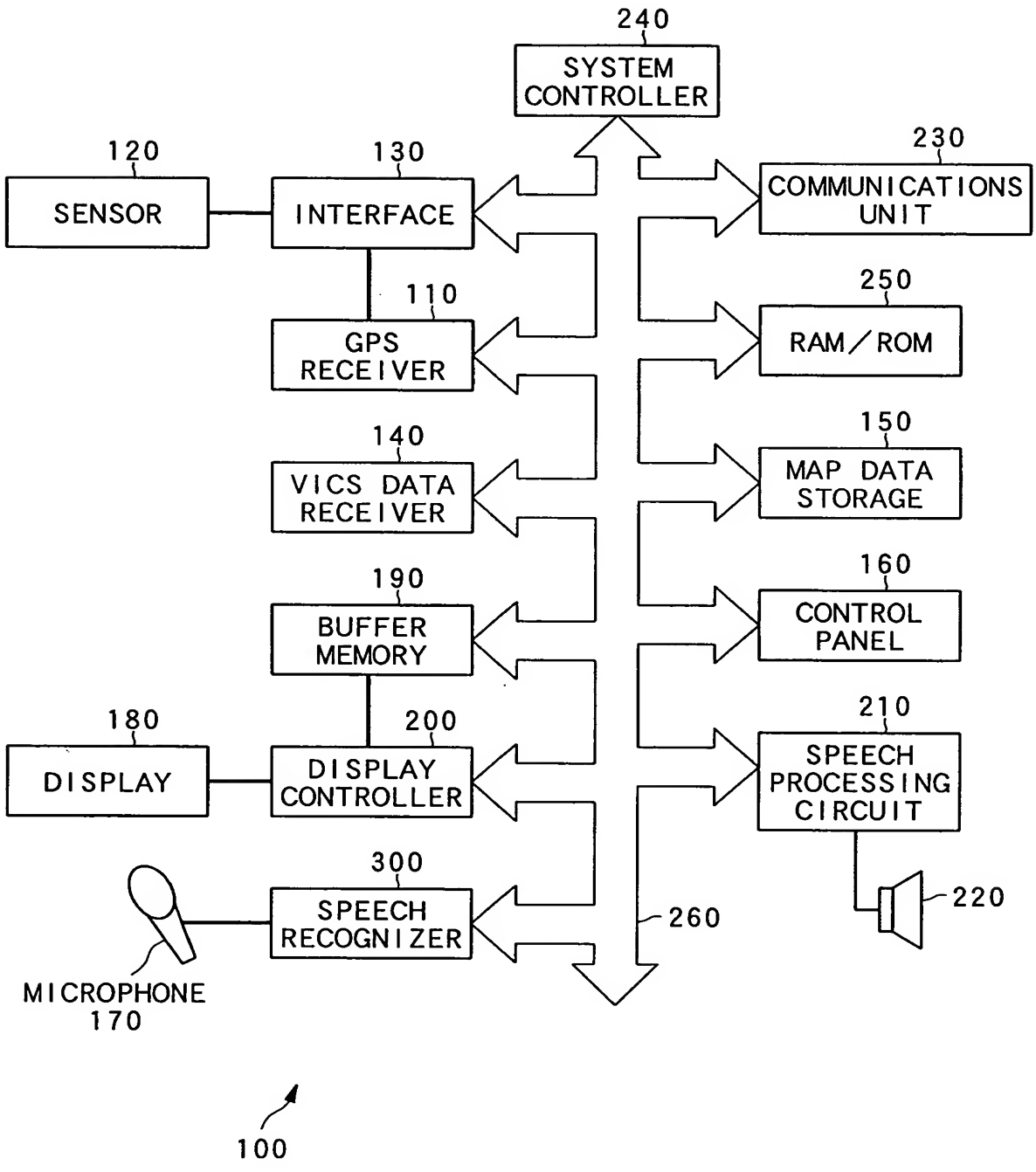
240
SYSTEM CONTROLLER
120
SENSOR
130
INTERFACE
230
COMMUNICATIONS UNIT
110
GPS RECEIVER
250
RAM / ROM
140
VICS DATA RECEIVER
150
MAP DATA STORAGE
190
BUFFER MEMORY
160
CONTROL PANEL
180
DISPLAY
200
DISPLAY CONTROLLER
210
SPEECH PROCESSING CIRCUIT
300
SPEECH RECOGNIZER
220
260
MICROPHONE 170
100

FIG. 2

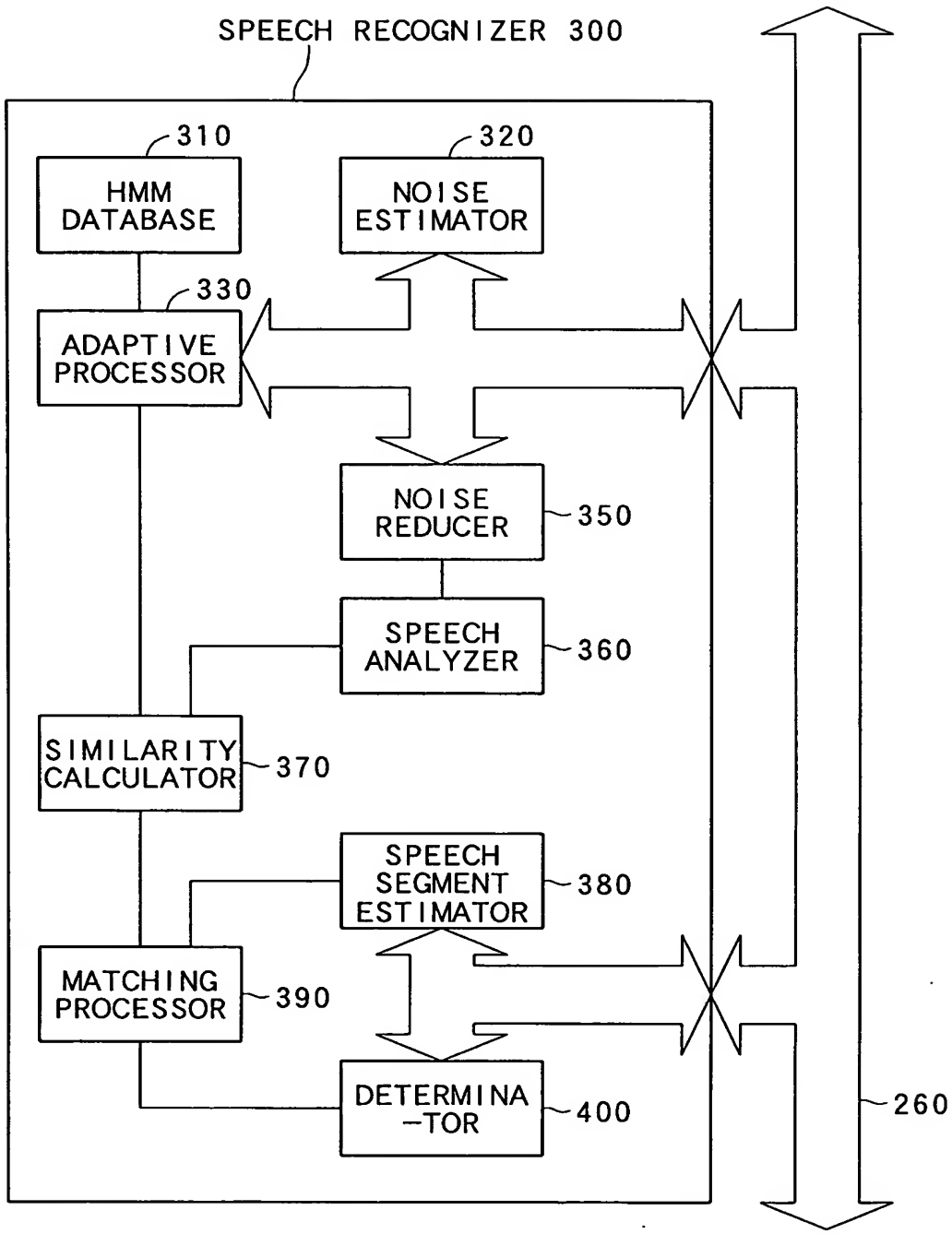
SPEECH RECOGNIZER 300
310
HMM DATABASE
320
NOISE ESTIMATOR
330
ADAPTIVE PROCESSOR
NOISE REDUCER
350
SPEECH ANALYZER
360
SIMILARITY CALCULATOR
370
SPEECH SEGMENT ESTIMATOR
380
MATCHING PROCESSOR
390
DETERMINA-TOR
400
260

FIG. 3

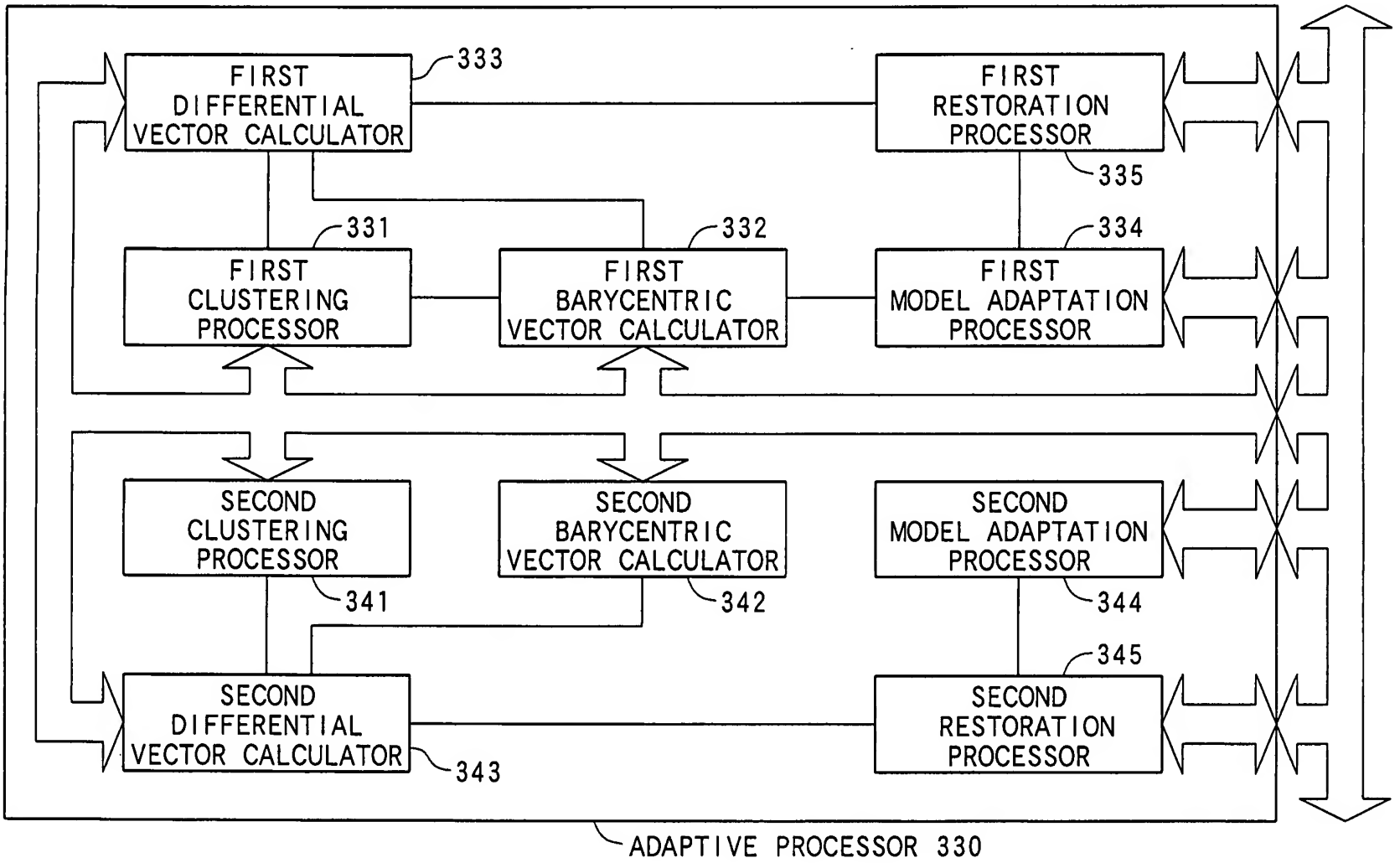
FIRST DIFFERENTIAL VECTOR CALCULATOR
333
FIRST RESTORATION PROCESSOR
335
331
332
334
FIRST CLUSTERING PROCESSOR
FIRST BARYCENTRIC VECTOR CALCULATOR
FIRST MODEL ADAPTATION PROCESSOR
SECOND CLUSTERING PROCESSOR
341
SECOND BARYCENTRIC VECTOR CALCULATOR
342
SECOND MODEL ADAPTATION PROCESSOR
344
345
SECOND DIFFERENTIAL VECTOR CALCULATOR
343
SECOND RESTORATION PROCESSOR
ADAPTIVE PROCESSOR 330

FIG. 4

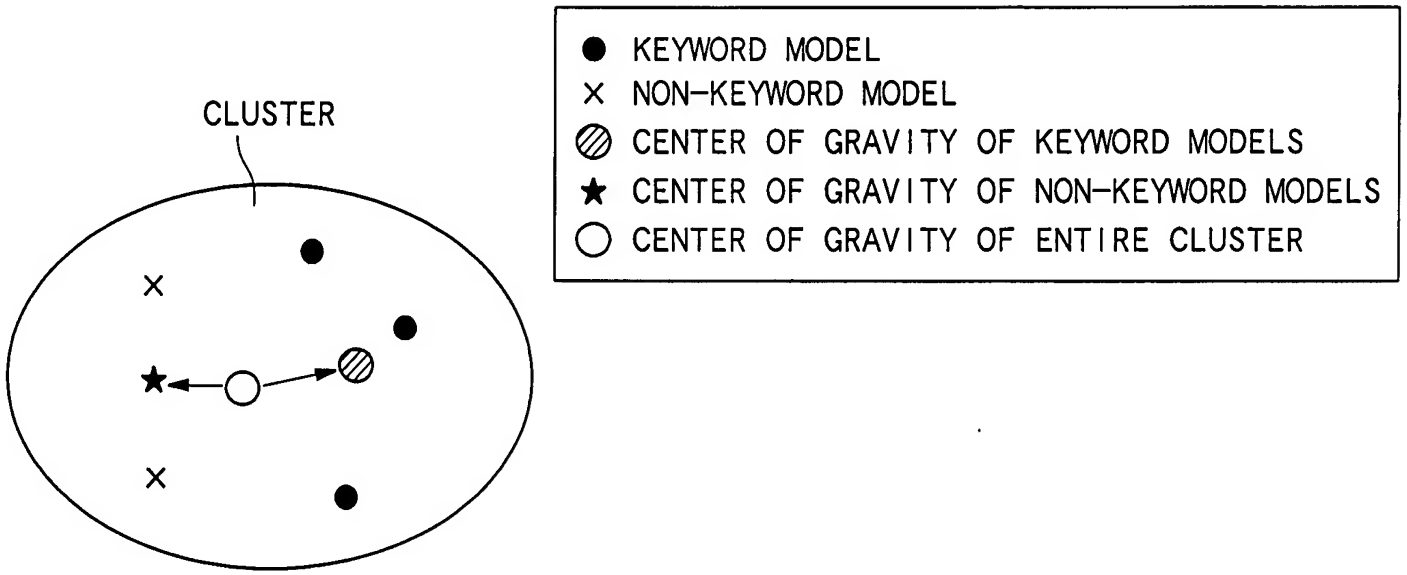
CLUSTER
KEYWORD MODEL
NON-KEYWORD MODEL
CENTER OF GRAVITY OF KEYWORD MODELS
CENTER OF GRAVITY OF NON-KEYWORD MODELS
CENTER OF GRAVITY OF ENTIRE CLUSTER

FIG. 5

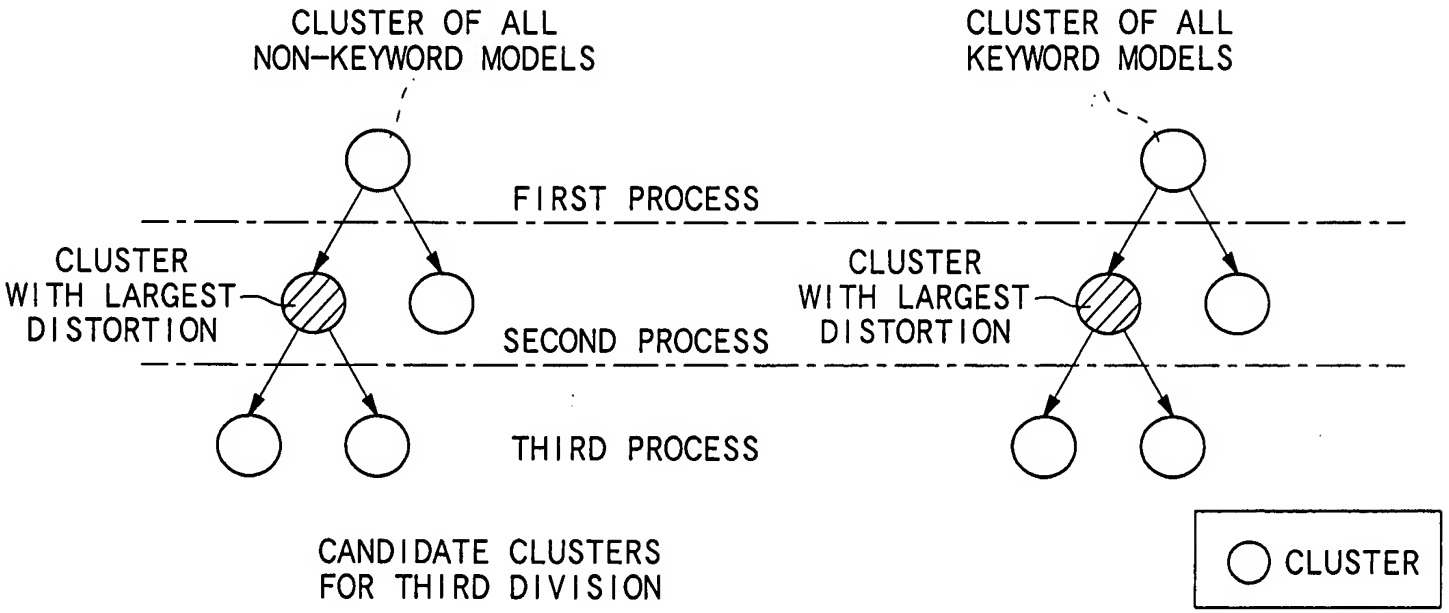
CLUSTER OF ALL NON-KEYWORD MODELS
CLUSTER OF ALL KEYWORD MODELS
FIRST PROCESS
CLUSTER WITH LARGEST DISTORTION
CLUSTER WITH LARGEST DISTORTION
SECOND PROCESS
THIRD PROCESS
CANDIDATE CLUSTERS FOR THIRD DIVISION
CLUSTER

FIG. 6

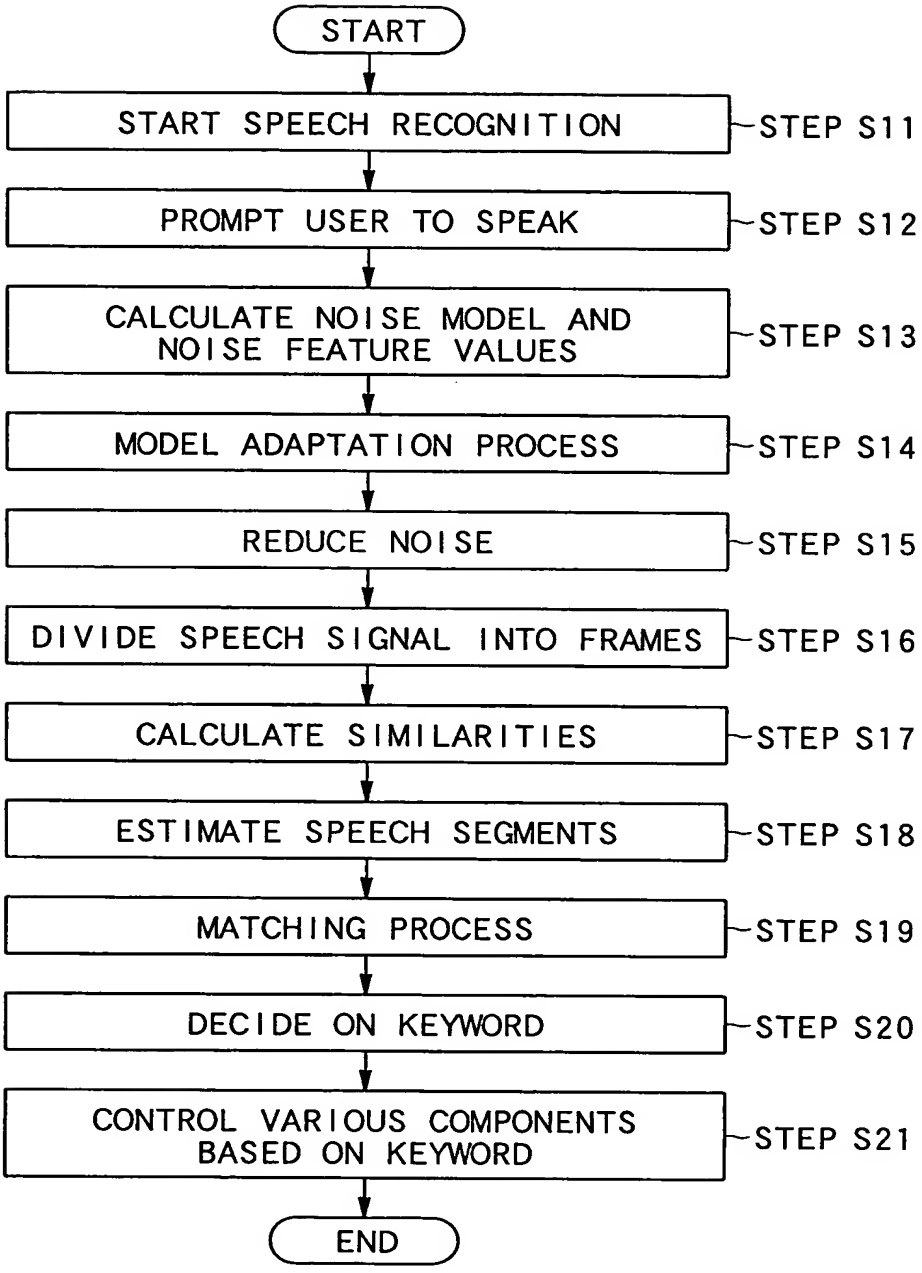
START
START SPEECH RECOGNITION
STEP S11
PROMPT USER TO SPEAK
STEP S12
CALCULATE NOISE MODEL AND NOISE FEATURE VALUES
STEP S13
MODEL ADAPTATION PROCESS
STEP S14
REDUCE NOISE
STEP S15
DIVIDE SPEECH SIGNAL INTO FRAMES
STEP S16
CALCULATE SIMILARITIES
STEP S17
ESTIMATE SPEECH SEGMENTS
STEP S18
MATCHING PROCESS
STEP S19
DECIDE ON KEYWORD
STEP S20
CONTROL VARIOUS COMPONENTS BASED ON KEYWORD
STEP S21
END

FIG. 7

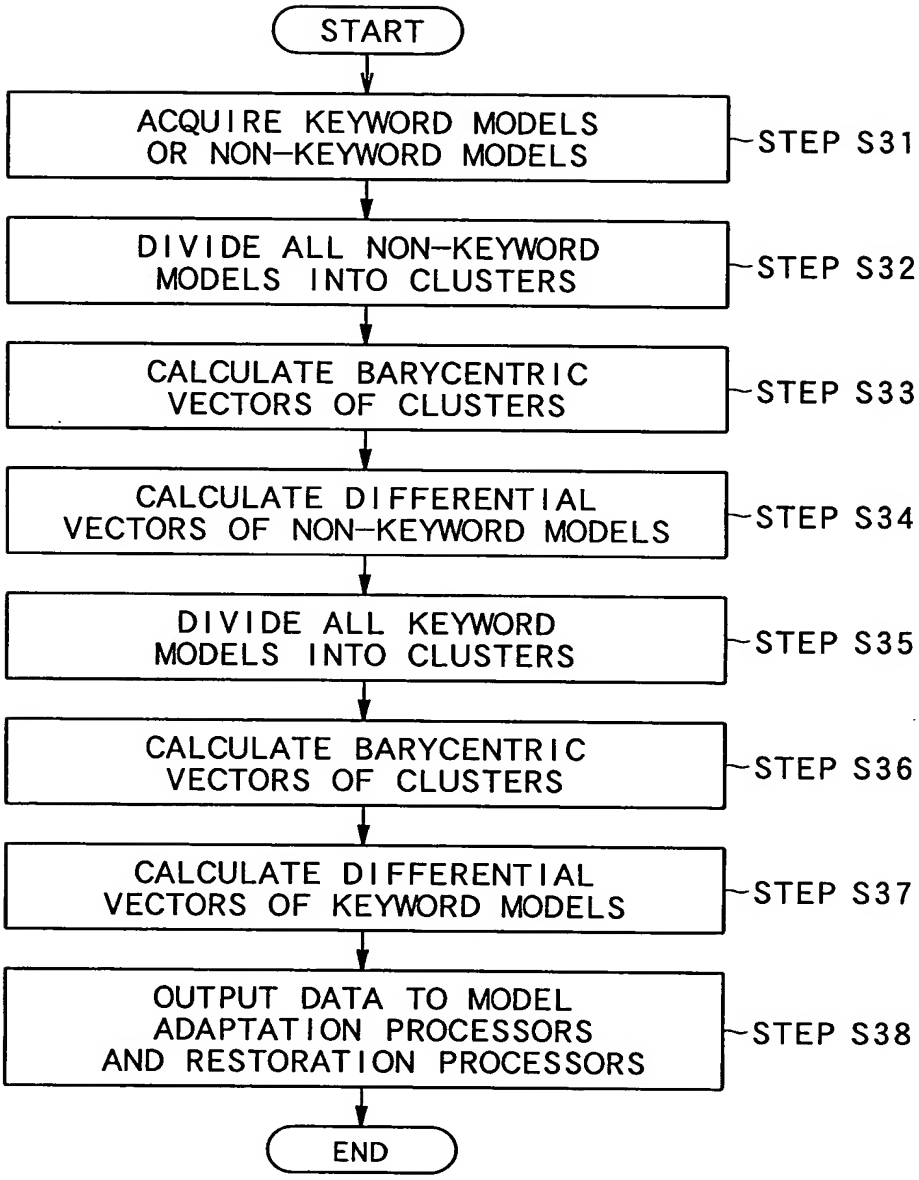
START
ACQUIRE KEYWORD MODELS OR NON-KEYWORD MODELS
STEP S31
DIVIDE ALL NON-KEYWORD MODELS INTO CLUSTERS
STEP S32
CALCULATE BARYCENTRIC VECTORS OF CLUSTERS
STEP S33
CALCULATE DIFFERENTIAL VECTORS OF NON-KEYWORD MODELS
STEP S34
DIVIDE ALL KEYWORD MODELS INTO CLUSTERS
STEP S35
CALCULATE BARYCENTRIC VECTORS OF CLUSTERS
STEP S36
CALCULATE DIFFERENTIAL VECTORS OF KEYWORD MODELS
STEP S37
OUTPUT DATA TO MODEL ADAPTATION PROCESSORS AND RESTORATION PROCESSORS
STEP S38
END

FIG. 8

	CASE 1(%)	CASE 2(%)	CASE 3(%)	AVERAGE(%)
CONVENTIONAL	93.3	69.2	54.1	72.2
THIS EMBODIMENT	94.1	68.9	58.5	73.8